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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,575	12/29/2003	Hyung Ki Hong	12581/4134	8928

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Post Office Box 10395  
Chicago, IL 60610

EXAMINER

NGUYEN, THANH NHAN P

ART UNIT PAPER NUMBER

2871

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/750,575

Applicant(s)

HONG, HYUNG KI

Examiner

(Nancy) Thanh-Nhan P. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-10 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-10 and 12-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

This communication is responsive to RCE dated 10/10/2006.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-4, 6-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi et al (US 2004/0100598) in view of Yamamoto et al (US 5,341,231) and further in view of Gotoh et al (US 2002/0154256).**

**Regarding claim 1**, Adachi discloses a liquid crystal display (LCD) module (fig. 8, ref. 1000) comprising a light source (101), a light guide panel (103) having a first refractive index, and a transmissive LCD panel (200) disposed on the upper portion of the light guide panel.

However, Adachi fails to specifically disclose a low refractive index layer disposed on the light guide panel having a second refractive index that is lower than the first refractive index.

Yamamoto discloses an LCD having a low refractive index layer disposed on the light guide having a second refractive index that is lower than the first refractive index (col. 9, lines 41-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have a low refractive index layer disposed on the light guide

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panel having a second refractive index that is lower than the first refractive index since one would be motivated to induce total reflection (col. 9, lines 26-30, 52-53) so that the layers above the light guide panel, such as the optical sheets and polarizer, can be directly adhered to the light guide plate (col. 9, lines 54-59). This ultimately provides a display that is capable of presenting a bright display (col. 3, lines 50-52; col. 54, lines 10-58).

Adachi further lacks disclosure of no substrate disposed between the liquid crystal and the light guide plate.

Gotoh discloses an LCD (fig. 24, ref. F) where there is no substrate disposed between the liquid crystal (309a) and the light guide plate (EM).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have no substrate disposed between the liquid crystal and the light guide plate since one would be motivated to not only use less components in the device but also to sufficiently introduce light into a region more suitable and with more uniformity ([0240-0242]).

**Regarding claim 7**, Adachi discloses a LCD module as recited above, however, the reference fails to specifically disclose a condenser disposed between the light source and the light guide panel.

Yamamoto discloses a condenser (fig. 6, ref. 62a, 62b) disposed between the light source and the light guide panel.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a condenser disposed between the light source and the

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light guide panel in Adachi since one would be motivated to limit the incident angle of the incident light from the light source lamps (col. 9, lines 21-22, 26-30, 52-53) so that the module is capable of presenting a bright display (col. 3, lines 50-52; col. 4, lines 10-58).

**Regarding claims 2 and 8**, Adachi discloses the LCD module as recited above, however, the reference fails to specifically disclose light in the light guide panel that is totally reflective at a border between the light guide panel and the low refractive index layer when the light in the light guide panel impinges on the border at an angle of  $90^\circ - \sin^{-1}(1/\text{first refractive index}) > \sin^{-1}(\text{the second refractive index}/\text{the first refractive index})$ .

Yamamoto discloses and LCD wherein the light in the light guide panel that is totally reflective at a border between the light guide panel and the low refractive index layer when the light in the light guide panel impinges on the border at an angle of  $90^\circ - \sin^{-1}(1/\text{first refractive index}) > \sin^{-1}(\text{the second refractive index}/\text{the first refractive index})$  (col. 5, line 26; col. 9, line 50; col. 10, line 63; col. 11, lines 55 – col. 12, line 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have light in the light guide panel that is totally reflective at a border between the light guide panel and the low refractive index layer when the light in the light guide panel impinges on the border at an angle of  $90^\circ - \sin^{-1}(1/\text{first refractive index}) > \sin^{-1}(\text{the second refractive index}/\text{the first refractive index})$  since one would be motivated to not only to induce total internal reflection (col. 9, lines 26-30, 52-53) so that the layers above the light guide panel, such as the optical sheets and polarizer can be

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directly adhered to the light guide plate (col. 9, lines 54-59), but to ultimately provide a display that is capable of presenting a bright display (col. 3, lines 50-52; col. 4, lines 10-58) without external complication (col. 5, lines 65-66).

**Regarding claims 4 and 10**, Adachi discloses the LCD module as recited above further comprising optical sheets (fig. 8, ref. 100-112) and a polarizer (209) disposed on the optical sheets.

**Regarding claims 13 and 14**, Adachi discloses the LCD module as recited above where the lower surface of the light guide panel has a plurality of grooves (fig. 8, ref. 105) to reflect light (1101) impinging on the grooves towards the transmissive LCD panel and further comprising a reflective plate (104) disposed below the light guide panel to reflect light towards the light guide and LCD panels.

**Regarding claims 3 and 9**, Adachi when modified by Yamamoto discloses the LCD module as recited above having a low refractive index layer disposed on the light guide panel such that the second index of the low refractive index layer is lower than that of the first index of the light guide panel, however, the reference fails to specifically disclose that the first refractive index is 1.7 or 1.5 and the second refractive index is 1.35.

Gotoh discloses an LCD lighting apparatus (title) having a low refractive index layer (fig. 13, ref. 89) with an index of 1.5 ([0151]) and the light guide plate (73) having an index of 1.5 ([151]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first refractive index of 1.5 or 1.7 and the second

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refractive index of 1.35 since one would be motivated not only to facilitate total internal reflection by decreasing the critical angle values, but also optimize display contrast by reducing the reflection factor at the boundaries ([0152-0156]).

**Claim 6** is met the discussion regarding claim 4 rejection above.

**Claim 12** is met the discussion regarding claim 10 rejection above.

### ***Response to Arguments***

Applicant's arguments filed 10/10/2006 have been fully considered but they are not persuasive.

Applicant's argument: "Gotoh describes an LCD which includes both an upper substrate 301 and a lower substrate 311 with fluorine-based liquid crystal layers 309a/b and a scattering liquid crystal EM disposed between. Since the EM are disposed between the two liquid crystal layers 309a and 309b, both the upper substrate and the lower substrate are required."

Examiner's answer: Applicant may have a point that Gotoh device really requires both the upper substrate and the lower substrate. However, the claim language in the current application does not specify the LCD device is one-substrate-device. And therefore, as reading the claim plainly, the limitation "no substrate is disposed between the liquid crystal and the light guide panel" is met by Gotoh reference.

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**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to (Nancy) Thanh-Nhan P. Nguyen whose telephone number is 571-272-1673. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

(Nancy) Thanh-Nhan P Nguyen  
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Art Unit 2871



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